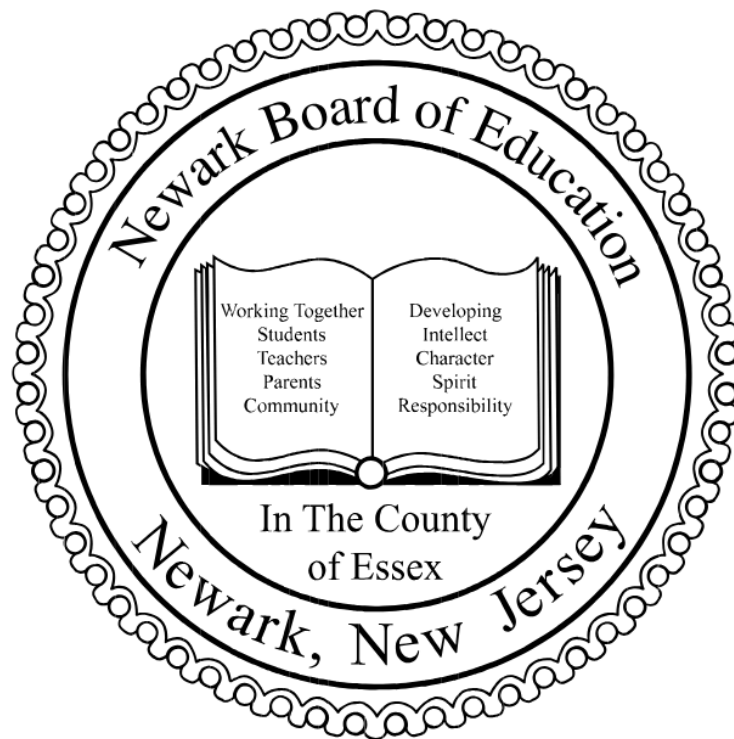




Probability & Statistics Curriculum Guide

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Course Description

This course presents statistics in a well-organized and systematic way that allows students to develop confidence along with core skills and conceptual understanding. Each unit is structured following an Experience First, Formalize Later (EFFL) model. Students explore through Math Medic and Tuva Labs, and then formalize their learning through *Statistics and Probability with Applications*, Fourth Edition.

Curriculum Map

STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
THE REAL NUMBER SYSTEM N-RN									
A. EXTEND THE PROPERTIES OF EXPONENTS TO RATIONAL EXPONENTS									
1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{\frac{1}{3}}$ to be the cube root of 5 because we want $(5^{\frac{1}{3}})^3 = 5^{(\frac{1}{3})^3}$ to hold, so $(5^{\frac{1}{3}})^3$ must equal 5.									
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.									
3. Simplify radicals, including algebraic radicals (e.g. $\sqrt[3]{54}=3\sqrt[3]{2}$, simplify $\sqrt{32x^2}$).									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
QUANTITIES N-Q									
A. REASON QUANTITATIVELY AND USE UNITS TO SOLVE PROBLEMS									
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. 									
2. Define appropriate quantities for the purpose of descriptive modeling. 									
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. 									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9

THE COMPLEX NUMBER SYSTEM N-CN

A. PERFORM ARITHMETIC OPERATIONS WITH COMPLEX NUMBERS

1.	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.									
2.	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.									
3.	(+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.									

B. REPRESENT COMPLEX NUMBERS AND THEIR OPERATIONS ON THE COMPLEX PLANE

4.	(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.								
5.	(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1 + \sqrt{3}i)^3 = 8$ because $-1 + \sqrt{3}i$ has modulus 2 and argument 120° .								
6.	(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.								

C. USE COMPLEX NUMBERS IN POLYNOMIAL IDENTITIES AND EQUATIONS

7.	Solve quadratic equations with real coefficients that have complex solutions.								
8.	(+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.								
9.	(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.								

STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
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VECTOR AND MATRIX QUANTITIES N-VM

A. REPRESENT AND MODEL WITH VECTOR QUANTITIES									
1.	(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., $\mathbf{v}$, $ \mathbf{v} $, $ \mathbf{v} $, v).								
2.	(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.								
3.	(+) Solve problems involving velocity and other quantities that can be represented by vectors.								
B. PERFORM OPERATIONS ON VECTORS.									
4.	(+) Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. Understand vector subtraction $\mathbf{v} - \mathbf{w}$ as $\mathbf{v} + (-\mathbf{w})$, where $-\mathbf{w}$ is the additive inverse of $\mathbf{w}$, with the same magnitude as $\mathbf{w}$ and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.								
5.	(+) Multiply a vector by a scalar. a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. b. Compute the magnitude of a scalar multiple $c\mathbf{v}$ using $ c\mathbf{v} = c v$. Compute the direction of $c\mathbf{v}$ knowing that when $ c v \neq 0$, the direction of $c\mathbf{v}$ is either along $\mathbf{v}$ (for $c > 0$) or against $\mathbf{v}$ (for $c < 0$).								
C. PERFORM OPERATIONS ON MATRICES AND USE MATRICES IN APPLICATIONS									
6.	(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.								
7.	(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.								
8.	(+) Add, subtract, and multiply matrices of appropriate dimensions.								

9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.									
10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.									
11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.									
12. (+) Work with 2×2 matrices as a transformation of the plane, and interpret the absolute value of the determinant in terms of area.									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
ARITHMETIC WITH POLYNOMIALS AND RATIONAL EXPRESSIONS A-APR									
A. PERFORM ARITHMETIC OPERATIONS ON POLYNOMIALS									
1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.									
B. UNDERSTAND THE RELATIONSHIP BETWEEN ZEROS AND FACTORS OF POLYNOMIALS									
2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.									
3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.									
C. USE POLYNOMIAL IDENTITIES TO SOLVE PROBLEMS									
4. (+) Prove polynomial identities and use them to describe numerical relationships. For example, the difference of two squares; the sum and difference of two cubes; the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.									

5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (Clarification: The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)									
D. REWRITE RATIONAL EXPRESSIONS									
6. Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.									
7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
CREATING EQUATIONS★ A-CED									
A. CREATE EQUATIONS THAT DESCRIBE NUMBERS OR RELATIONSHIPS									
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. 🌱									
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.									
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. 🌱									
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R . 🌱									

[illegible]

B. WRITE EXPRESSIONS IN EQUIVALENT FORMS TO SOLVE PROBLEMS

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★
- Factor a quadratic expression to reveal the zeros of the function it defines.
 - Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
 - Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $(1.15^{\frac{1}{12}})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

4. (+) Derive and/or explain the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments. ★

Standard**UNIT
1****UNIT 2****UNIT 3****UNIT 4****UNIT 5****UNIT 6****UNIT 7****UNIT 8****UNIT 9****BUILDING FUNCTIONS F-BF****A. BUILD A FUNCTION THAT MODELS A RELATIONSHIP BETWEEN TWO QUANTITIES**

1. Write a function that describes a relationship between two quantities. ★
- Determine an explicit expression, a recursive process, or steps for calculation from a context.
 - Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
 - (+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.

2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. ★

B. BUILD NEW FUNCTIONS FROM EXISTING FUNCTIONS

3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$,

9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.									
Standard	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
LINEAR AND EXPONENTIAL MODELS★ F-LE									
A. CONSTRUCT AND COMPARE LINEAR AND EXPONENTIAL MODELS AND SOLVE PROBLEMS									
1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.									
2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).									
3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.									
4. Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.									
B. INTERPRET EXPRESSIONS FOR FUNCTIONS IN TERMS OF THE SITUATION THEY MODEL									
5. Interpret the parameters in a linear or exponential function in terms of a context.									
Standard	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
TRIGONOMETRIC FUNCTIONS F-TF									

A. EXTEND THE DOMAIN OF TRIGONOMETRIC FUNCTIONS USING THE UNIT CIRCLE									
1. (+) Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.									
2. (+) Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.									
3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\frac{\pi}{3}$, $\frac{\pi}{4}$, and $\frac{\pi}{6}$, and use the unit circle to express the values of sine, cosines, and tangent for πx , $\pi + x$ and $2\pi - x$ in terms of their values for x , where x is any real number.									
4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.									
B. MODEL PERIODIC PHENOMENA WITH TRIGONOMETRIC FUNCTIONS									
5. (+) Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. ★									
6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.									
7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context. ★									
C. PROVE AND APPLY TRIGONOMETRIC IDENTITIES									
8. (+) Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.									
9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9

CIRCLES G-C

A. UNDERSTAND AND APPLY THEOREMS ABOUT CIRCLES

1. Prove that all circles are similar.									
2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.									
3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.									
4. (+) Construct a tangent line from a point outside a given circle to the circle.									

B. FIND ARC LENGTHS AND AREAS OF SECTORS OF CIRCLES

5.	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.								
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STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
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CONGRUENCE G-CO

A. EXPERIMENT WITH TRANSFORMATIONS IN THE PLANE

1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.									
2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).									
3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.									
4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.									

5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.									
B. UNDERSTAND CONGRUENCE IN TERMS OF RIGID MOTIONS									
6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.									
7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.									
8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.									
C. PROVE GEOMETRIC THEOREMS									
9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.									
10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.									
11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.									
D. MAKE GEOMETRIC CONSTRUCTIONS									
12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to									

a given line through a point not on the line.									
13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
GEOMETRIC MEASUREMENT AND DIMENSION G-GMD									
A. EXPLAIN VOLUME FORMULAS AND USE THEM TO SOLVE PROBLEMS									
1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.									
2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.									
3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★									
B. VISUALIZE RELATIONSHIPS BETWEEN TWO-DIMENSIONAL AND THREE-DIMENSIONAL OBJECTS									
4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.									
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS G-GPE									
A. TRANSLATE BETWEEN THE GEOMETRIC DESCRIPTION AND THE EQUATION FOR A CONIC SECTION									
1. (+) Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.									
2. (+)Derive the equation of a parabola given a focus and directrix.									
3. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.									
B. USE COORDINATES TO PROVE SIMPLE GEOMETRIC THEOREMS ALGEBRAICALLY									

unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.									
2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.									
3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.									
B. PROVE THEOREMS INVOLVING SIMILARITY									
4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.									
5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.									
C. DEFINE TRIGONOMETRIC RATIOS AND SOLVE PROBLEMS INVOLVING RIGHT TRIANGLES									
6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.									
7. Explain and use the relationship between the sine and cosine of complementary angles.									
8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. ★									
D. APPLY TRIGONOMETRY TO GENERAL TRIANGLES									
9. (+) Derive the formula $A = \frac{1}{2}ab\sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.									
10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.									
11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).									

STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
INTERPRETING CATEGORICAL AND QUANTITATIVE DATA S-ID									
A. SUMMARIZE, REPRESENT, AND INTERPRET DATA ON A SINGLE COUNT OR MEASUREMENT VARIABLE									
1. Represent data with plots on the real number line (dot plots, histograms, and box plots). 🌱	?	?	?				?		
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	?	?							
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	?	?							
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.		?				?			
B. SUMMARIZE, REPRESENT, AND INTERPRET DATA ON TWO CATEGORICAL AND QUANTITATIVE VARIABLES									
5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	?								
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. 🌱 a. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models. 🌱 b. Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology. c. Fit a linear function for a scatter plot that suggests a linear association.			?						
C. INTERPRET LINEAR MODELS									

7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.			?						
8. Compute (using technology) and interpret the correlation coefficient of a linear fit.			?						
9. Distinguish between correlation and causation.			?						
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9
MAKING INFERENCES AND JUSTIFYING CONCLUSIONS S-IC									
A. UNDERSTAND AND EVALUATE RANDOM PROCESSES UNDERLYING STATISTICAL EXPERIMENTS									
1. (+) Understand statistics as a process for making inferences about population parameters based on a random sample from that population.				?		?	?	?	?
2. (+) Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?					?				
B. MAKE INFERENCES AND JUSTIFY CONCLUSIONS FROM SAMPLE SURVEYS, EXPERIMENTS, AND OBSERVATIONAL STUDIES									
3. (+) Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.				?					
4. (+) Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.						?	?		
5. (+) Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.				?					
6. (+) Evaluate reports based on data (e.g. interrogate study design, data sources, randomization, the way the data are analyzed and displayed, inferences drawn and methods used; identify and explain misleading uses of data; recognize when arguments based on data are flawed).				?		?	?	?	?
STANDARD	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9

CONDITIONAL PROBABILITY AND THE RULES OF PROBABILITY S-CP

A. UNDERSTAND INDEPENDENCE AND CONDITIONAL PROBABILITY AND USE THEM TO INTERPRET DATA

1. (+) Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).					?				
2. (+) Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.					?				
3. (+) Understand the conditional probability of A given B as $\frac{P(A \text{ and } B)}{P(B)}$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .					?				
4. (+) Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.					?				
5. (+) Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.					?				

B. USE THE RULES OF PROBABILITY TO COMPUTE PROBABILITIES OF COMPOUND EVENTS IN A UNIFORM PROBABILITY MODEL

6. (+) Find the conditional probability of A given B as the fraction of B 's outcomes that also belong to A , and interpret the answer in terms of the model.					?				
7. (+) Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.					?				
8. (+) Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B A) = P(B)P(A B)$, and interpret the answer in terms of the model.					?				

random number generator).									
7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).									

Pacing Guide

UNIT		STANDARDS	PACING	2026-2027
QUARTER 1				
<u>Unit 1:</u> <u>Analyzing</u> <u>One-Variable</u> <u>Data</u>	A: Organizing Data	HS-S.ID.B.5	3 days	September 8-10
	B: Displaying Data	HS-S.ID.A.1, HS-S.ID.A.2, HS-S.ID.A.3	9 days	September 11-23
	C: Summarizing Data	HS-S.ID.A.1, HS-S.ID.A.2, HS-S.ID.A.3	11 days	September 24 - October 8
	UNIT ASSESSMENT		1 day	October 9
<u>Unit 2:</u> <u>Modeling</u> <u>One-Variable</u> <u>Quantitative</u> <u>Data</u>	A: Describing Location in a Distribution	HS-S.ID.A.4	2 days	October 13-14
	B: Transforming Data	HS-S.ID.A.1, HS-S.ID.A.2	2 days	October 15-16
	C: Using Density Curves	HS-S.ID.A.2, HS-S.ID.A.3, HS-S.ID.A.4	10 days	October 19 - November 3
	Flexible Day for SAT Assessment		1 day	October 27
	UNIT ASSESSMENT		1 day	November 4
<u>Unit 3:</u> <u>Analyzing</u>	A: Analyzing Two-Variable Data	HS-S.ID.A.1, HS-S.ID.B.6	5 days	November 9-16

Two-Variable Data				
QUARTER 2				
Unit 3: Analyzing Two-Variable Data	B: Interpreting Correlation	HS-S.ID.B.6, HS-S.ID.C.7, HS-S.ID.C.8, HS-S.ID.C.9	8 days	November 17 - December 1
	C: Modeling with Regression Lines	HS-S.ID.B.6, HS-S.ID.C.7, HS-S.ID.C.8	11 days	December 2-16
	UNIT ASSESSMENT		1 day	December 17
Unit 4: Collecting Data	A: Asking Statistical Questions	HS-S.IC.A.1 (+)	4 days	December 18-23
	B: Making Inferences from Samples	HS-S.IC.A.1 (+), HS-S.IC.B.3 (+), HS-S.IC.B.6 (+)	7 days	January 4-12
	C: Making Inferences from Experiments	HS-S.IC.B.3 (+), HS-S.IC.B.5 (+), HS-S.IC.B.6 (+)	7 days	January 13 - February 2
	MIDTERM EXAMS		6 days	January 21-29
	UNIT ASSESSMENT		1 day	February 3
QUARTER 3				
Unit 5: Probability	A: Understanding Probability	HS-S.IC.A.2 (+)	4 days	February 4-9
	B: Deriving Probability Rules	HS-S.IC.A.2 (+), HS-S.CPA.1 (+), HS-S.CPA.2 (+), HS-S.CPA.3 (+), HS-S.CPA.4 (+), HS-S.CPB.7 (+)	8 days	February 10-22
	C: Applying the Multiplication Rule	HS-S.CPA.2 (+), HS-S.CPB.5 (+), HS-S.CPB.6 (+), HS-S.CPB.8 (+), HS-S.CPB.9 (+)	9 days	February 23 - March 8
	UNIT ASSESSMENT		1 day	March 9
Unit 6: Sampling Distributions	A: Using Sampling Distributions	HS-S.IC.A.1 (+), HS-S.IC.B.4 (+)	5 days	March 11-17
	B: Describing Sampling Distributions	HS-S.IC.A.1 (+), HS-S.IC.B.4 (+), HS-S.IC.B.6 (+)	2 days	March 18-19
	C: Finding Probabilities Involving $\hat{p}$	HS-S.IC.A.1 (+), HS-S.IC.B.4 (+), HS-S.ID.A.4	2 days	March 22-23
	D: Finding Probabilities Involving $\bar{x}$	HS-S.IC.A.1 (+), HS-S.ID.A.4	9 days	March 24 - April 13

	UNIT ASSESSMENT		1 day	April 14
<u>Unit 7: Estimating a Parameter</u>	A: Making Decisions Using Confidence Intervals	HS-S.ID.A.1, HS-S.IC.A.1 (+), HS-S.IC.B.6 (+)	4 days	April 15-20
QUARTER 4				
<u>Unit 7: Estimating a Parameter</u>	A: Making Decisions Using Confidence Intervals	HS-S.ID.A.1, HS-S.IC.A.1 (+), HS-S.IC.B.6 (+)	2 days	April 21-22
	B: Estimating a Proportion	HS-S.IC.A.1 (+), HS-S.IC.B.4 (+), HS-S.IC.B.6 (+)	4 days	April 23-28
	C: Estimating a Mean	HS-S.IC.A.1 (+), HS-S.IC.B.4 (+)	4 days	April 29 - May 4
	UNIT ASSESSMENT		1 day	May 5
<u>Unit 8: Testing a Claim</u>	A: Determining Statistical Significance	HS-S.IC.A.1 (+), HS-S.IC.B.6 (+)	4 days	May 6-11
	B: Testing a Claim about a Proportion	HS-S.IC.A.1 (+), HS-S.IC.B.6 (+)	4 days	May 12-17
	C: Testing a Claim about a Mean	HS-S.IC.A.1 (+), HS-S.IC.B.6 (+)	5 days	May 18-24
	UNIT ASSESSMENT		1 day	May 25
<u>Unit 9: Comparing Two Populations or Treatments</u>	A: Comparing Two Proportions	HS-S.IC.A.1 (+), HS-S.IC.B.3 (+), HS-S.IC.B.5 (+), HS-S.IC.B.6 (+)	5 days	May 26 - June 2
	B: Comparing Two Means	HS-S.IC.A.1 (+), HS-S.IC.B.6 (+)	11 days	June 3-28
	UNIT ASSESSMENT		1 day	June 4
FINAL EXAMS			5 days	June 7-11